FUEL SUPPLY SYSTEM COMPONENTS, REMOVING AND INSTALLING

NOTE:

- **Hose connections are secured with either screw or spring clips.**
- **Always replace clamp type clips with screw or spring clips.**

Fuel filter, servicing. See **FUEL FILTER, SERVICING**

Observe safety precautions. See **SAFETY PRECAUTIONS WHEN WORKING ON THE FUEL SUPPLY SYSTEM** .

Observe rules for cleanliness. See **RULES FOR CLEANLINESS** .

Accelerator mechanism, servicing. See **ACCELERATOR MECHANISM, SERVICING** .

FUEL TANK SYSTEM, REMOVING AND INSTALLING

NOTE: The following list refers to items in Fig. 1 .

1. **Sealing cap**
   - Secured with strap from m.y. 2000
2. **Seal**
   - Replace if damaged
3. **Bolt**
4. **Tank flap unit**
   - With rubber cup
5. **Ground connection**
6. **O-ring**
   - Replace
7. **Vent valve**
   - To remove: unclip valve out of side support
   - Before installing, remove sealing cap (item 1)
   - Checking: See **Vent valve, checking** .
8. **Vent line**
   - Make sure it is securely seated
9. **Clamping washer**
10. **Heat shield**

11. **Fuel tank cover**
12. **25 N.m (18 ft lb)**
13. **Mounting strap**
    - Note differing lengths
14. **Fuel tank**
    - Support with VAG 1383 A engine/transmission jack when removing
        - Removing and installing. See **FUEL TANK, REMOVING AND INSTALLING** .
15. **Sealing ring**
    - Replace if damaged
    - Moisten with fuel when installing
16. **Fuel gauge sensor**
    - Note installed position on fuel tank. See **Fuel gauge sensor, installed position** .
17. **Union nut**
    - Remove and install using 3217 wrench
18. **Supply line**
    - To fuel filter. See **FUEL FILTER, SERVICING** , item -2-.
    - Clipped onto fuel tank
    - Make sure it is securely seated
    - Black
    - To remove flange: press down on tabs at connection
19. **Return line**
    - From fuel filter. See **FUEL FILTER, SERVICING** , item -2-.
    - At connection -R-
    - Blue or blue markings
    - Clipped onto fuel tank
    - Make sure it is securely seated
    - To remove from flange, press down on tabs at connection
20. **Clamp**
    - Replace clamps
21. **Hose**
22. **Gravity/overflow valve**
    - To remove valve, unclip upward out of support
    - Check valve for flow valve vertical: open, valve tilted 45° : closed
23. **10 N.m (7 ft lb)**

Fig. 1: Exploded View Of Fuel Tank System
Courtesy of VOLKSWAGEN OF AMERICA, INC.

Fuel gauge sensor, installed position

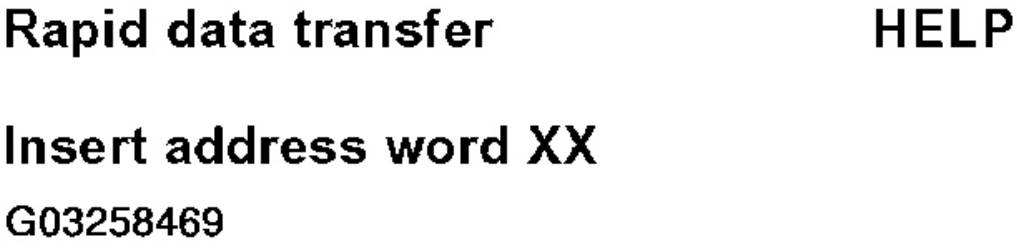

Fig. 2: Identifying Fuel Gauge Sensor
Courtesy of VOLKSWAGEN OF AMERICA, INC.

Mark on sensor must align with mark on fuel tank (arrows).

NOTE: After installing fuel gauge sensor make sure that the supply and return lines are securely clipped into the fuel tank.

Vent valve, checking

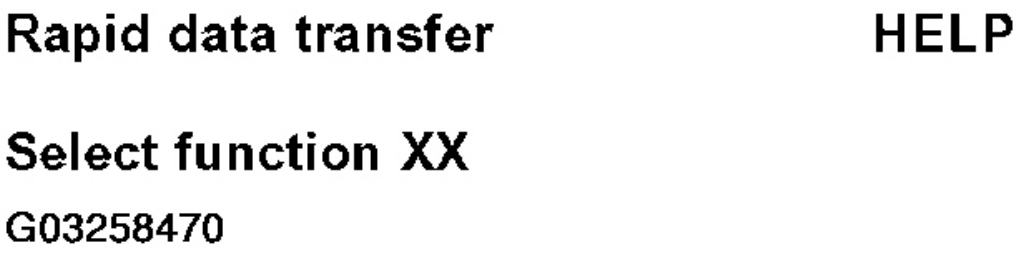

Fig. 3: Checking Vent Valve
Courtesy of VOLKSWAGEN OF AMERICA, INC.

- Lever in rest position: Closed
- Lever pushed in direction of arrow: Open

NOTE: Remove fuel tank sealing cover before installing vent valve.

FUEL FILTER, SERVICING

NOTE: The following list refers to items in Fig. 4 .

1. **Return line**
   - From Diesel injection pump
2. **Supply line**
   - To Diesel injection pump
3. **O-ring**
   - Replace
4. **Control valve**
   - Installation position: arrow points towards fuel tank
   - When changing filter: remove mounting clip then remove control valve complete with fuel lines
   - Below + 15° C: Passageway to filter open
   - Over + 31° C: Passageway to filter closed
5. **Mounting clip**
6. **Return line**
   - To fuel tank
7. **Supply line**
   - From fuel tank

8. **Fuel filter**
    - Fill with Diesel fuel before installing
    - Flow direction is marked by an arrow
    - Do not interchange connections
    - Replace if damaged
9. **Gasket**
    - Replace if damaged
10. **Water drain plug**
    - To bleed: remove mounting clip then remove control valve complete with attached fuel lines
    - Loosen and allow approx. 100 cc's of fluid to drain

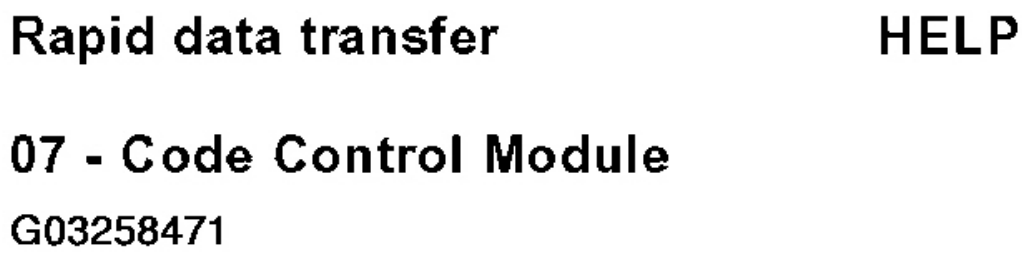

Fig. 4: Exploded View Of Fuel Filter Assembly
Courtesy of VOLKSWAGEN OF AMERICA, INC.

SAFETY PRECAUTIONS WHEN WORKING ON THE FUEL SUPPLY SYSTEM

> **WARNING: Fire hazard. Do NOT smoke or have anything in the area that can ignite Diesel fuel.**

When removing and installing the fuel gauge sensor from a full or partly filled fuel tank, observe the following:

- Before starting repairs, switch on an exhaust extraction system and place an extraction hose close to the sensor opening in the fuel tank to extract escaping Diesel fuel fumes. If no exhaust extraction system is available, a radial fan (as long as motor is not in air flow) with a displacement greater than 15 m^3 /h can be used.
- Avoid fuel contact with bare skin! Wear fuel-resistant gloves!

RULES FOR CLEANLINESS

When working on the fuel supply/injection system, pay careful attention to the following rules:

- Thoroughly clean all unions and adjacent areas before disconnecting.
- Place parts that have been removed on a clean surface and cover. Do not use fluffy cloths!
- Carefully cover opened components or seal, if the repair cannot be carried out immediately.
- Only install clean components: Only unpack replacement parts immediately prior to installation. Do not use parts that have been stored loose (e.g. in tool boxes etc.).
- When the system is open: Do not work with compressed air if it can be avoided. Do not move vehicle unless absolutely necessary.
- Make sure that no Diesel fuel runs onto the coolant hoses. Immediately clean any accidental hose contamination. Affected hoses must be replaced immediately.

FUEL TANK, REMOVING AND INSTALLING

Special tools and equipment

- VAG 1383 A Engine/transmission jack

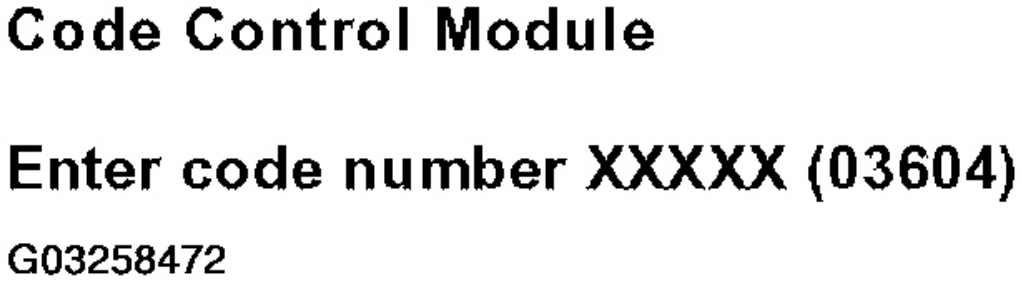

Fig. 5: Identifying VAG 1383 Engine/Transmission Jack
Courtesy of VOLKSWAGEN OF AMERICA, INC.

- VAG 1331 Torque wrench 5 to 50 N.m (3.7 to 37 ft lb)

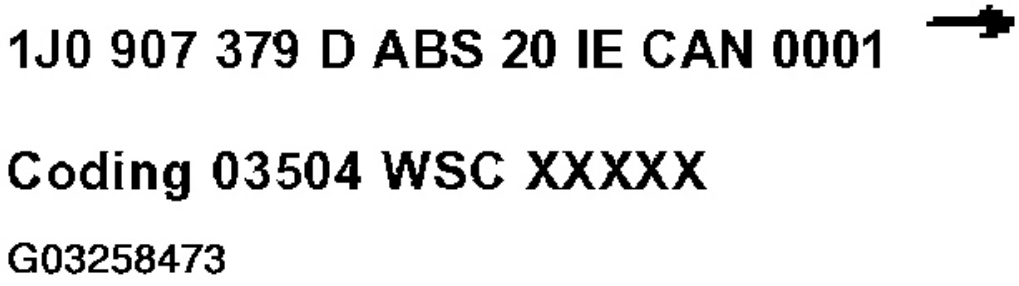

Fig. 6: Identifying VAG 1331 Torque Wrench
Courtesy of VOLKSWAGEN OF AMERICA, INC.

Removing

- Note safety precautions before starting work. See **SAFETY PRECAUTIONS WHEN WORKING ON THE FUEL SUPPLY SYSTEM** .

  CAUTION: Obtain radio anti-theft code before disconnecting battery Ground strap.

- Open fuel filler.
- With ignition switched off disconnect battery Ground strap.
- Remove rear axle:

  See **FRONT AXLE SHAFT** .

- Remove right rear wheel housing liner:

  See **REAR WHEEL HOUSINGS LINER, ASSEMBLY OVERVIEW** .

- Remove cover from fuel reservoir (arrows).

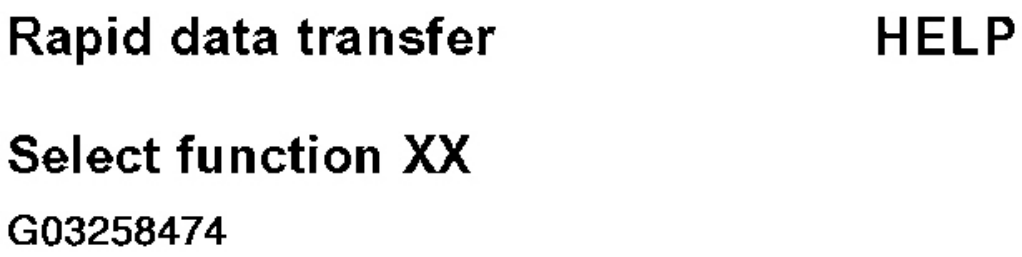

Fig. 7: Removing Cover From Fuel Reservoir
Courtesy of VOLKSWAGEN OF AMERICA, INC.

- Drain fuel tank, clean fuel filler neck and surrounding area.
- Disconnect vent lines at filler neck
- Press separated vent hose through opening in long member in fuel tank direction.
- Remove mounting bolts on filler neck.
- Fold rear bench seat forward.
- Remove fuel gauge sensor cover plate.
- Disconnect fuel supply and return lines front, right at fuel reservoir

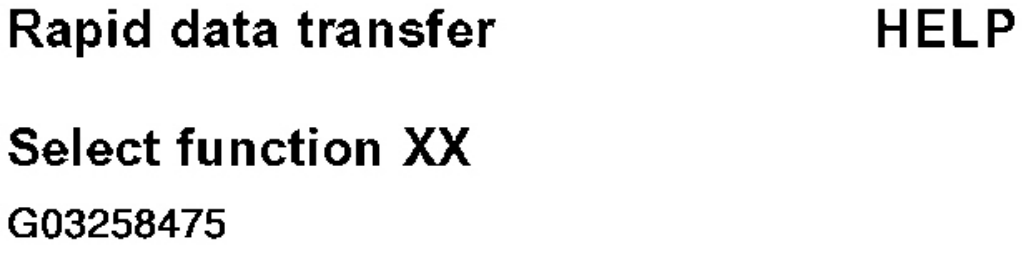

Fig. 8: Disconnecting Fuel Supply And Return Lines Front
Courtesy of VOLKSWAGEN OF AMERICA, INC.

NOTE: Press buttons on hose couplings (arrows) to do this.

- Remove tensioning strap. While removing strap, support fuel tank with VAG 1383 A engine/transmission jack.

- Lower fuel tank.

Installing

Installation is carried out in the reverse order of the removal procedure. Note the following during installation:

- Guide vent lines through opening in long member (install wiring guide)
- Secure vent lines at filler neck with clamps
- Route breather hoses kink free.
- Do not interchange supply and return hoses (return: blue or blue markings, supply: black).
- Clip supply and return lines onto fuel tank.

ACCELERATOR MECHANISM, SERVICING

NOTE: The following list refers to items in Fig. 9 .

1. **10 N.m (7 ft lb)**
2. **Throttle Position (TP) sensor -G79-**
   - Checking. See **THROTTLE POSITION SENSOR, CHECKING** .
   - Adjusting: See **THROTTLE POSITION SENSOR, ADJUSTING** .
   - Remove if instrument panel and/or pedal cluster cover require removal
3. **Cable cam**
4. **Spring washer 5-10 N.m (7 ft lb)**
5. **Threaded piece**
6. **Mounting bracket**
   - Self-locking hex nut, 20 Nm (15 ft. lb)

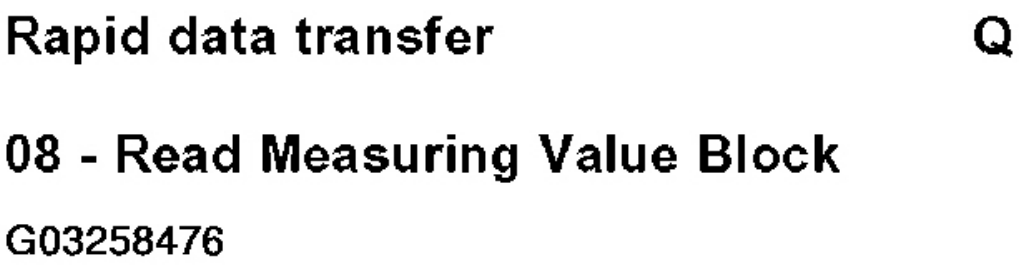

Fig. 9: Disassembled View Of Accelerator Mechanism
Courtesy of VOLKSWAGEN OF AMERICA, INC.

THROTTLE POSITION SENSOR, CHECKING

Special tools and equipment

- Fluke 83 multimeter
- VW 1594 Adaptor kit
- VAG 1598/22 Test Box
- VAG 1551/1552 Scan Tool with VAG 1551/3 adaptor cable
- Wiring diagram

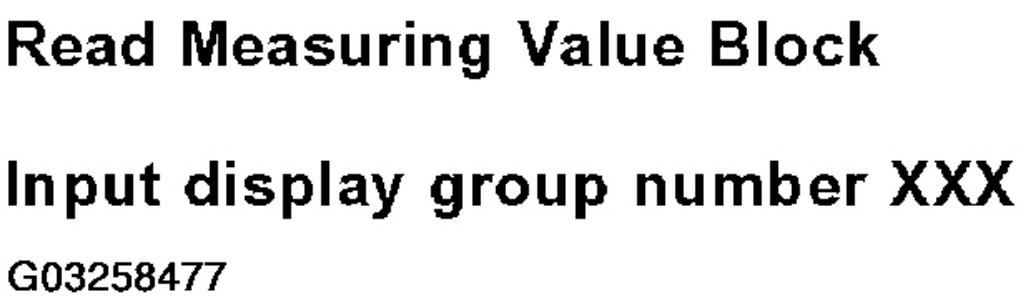

Fig. 10: Identifying Special Tools And Equipment
Courtesy of VOLKSWAGEN OF AMERICA, INC.

Test sequence

- Connect VAG 1551/1552 Scan Tool:

  See VAG1551/1552 Scan Tool, Connecting .

- Make sure that ignition is switched ON.
- Press 0 and 1 buttons to select Address word 01: "Engine electronics".

Display will appear as shown in **Fig. 11**

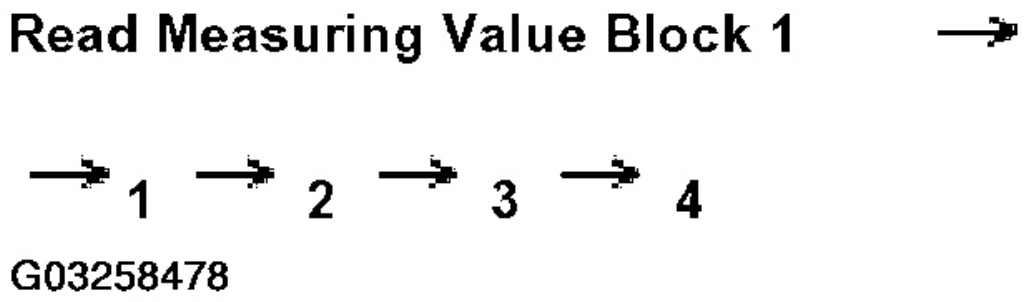

Fig. 11: Identifying VAG 1551/1552 Scan Tool Display (1 Of 4)
Courtesy of VOLKSWAGEN OF AMERICA, INC.

- Press 0 and 8 buttons to select Function 08: "Read measuring value block".
- Press Q button to enter input

Display will appear as shown

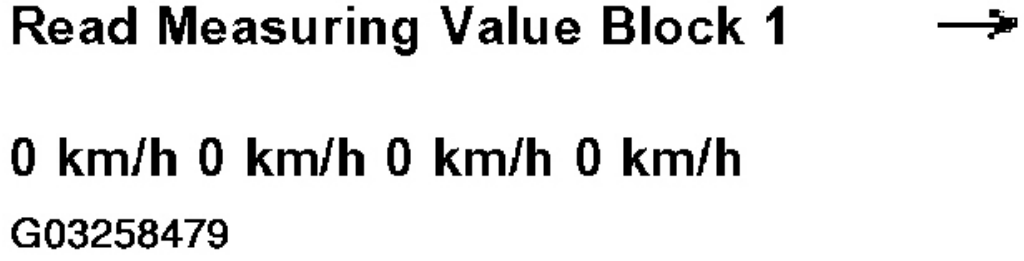

Fig. 12: Identifying VAG 1551/1552 Scan Tool Display (2 Of 4)
Courtesy of VOLKSWAGEN OF AMERICA, INC.

- Press 0, 0 and 2 buttons to select "Display group 2".
- Press Q button to enter input
- Check throttle position in display zone 2. Do NOT depress accelerator pedal.

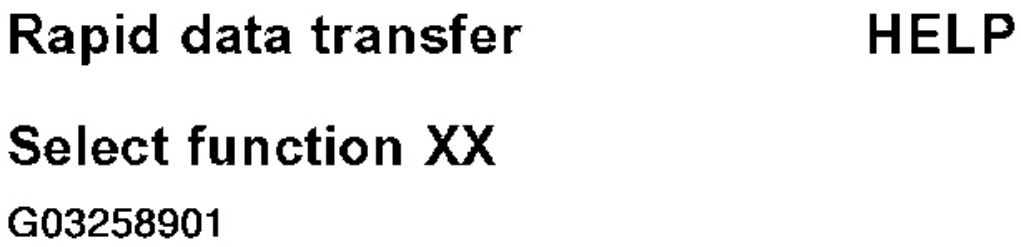

Fig. 13: Identifying VAG 1551/1552 Scan Tool Display (3 Of 4)
Courtesy of VOLKSWAGEN OF AMERICA, INC.

Specification: 0.0%

- Also check Closed Throttle Position switch display in display zone 3. Center position must show a "1".

Display must appear as shown: 010

- Slowly depress accelerator pedal (until fully depressed), and observe display zones 2 and 3.

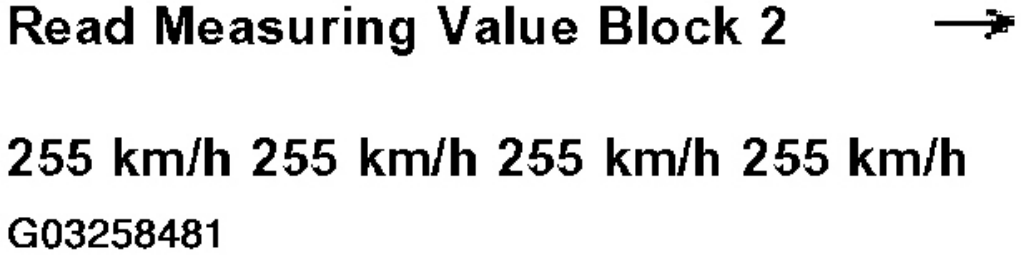

Fig. 14: Identifying VAG 1551/1552 Scan Tool Display (4 Of 4)
Courtesy of VOLKSWAGEN OF AMERICA, INC.

Display zone 2:

Throttle Position value must increase continuously.

Specification at Wide Open Throttle position: 100%

Display zone 3:

Center digit must change to a 0

Display must appear as: 000

If End specification value not achieved:

- Press --> button.
- Press 0 and 6 buttons to select Function 06: "End transfer".
- Press Q button to enter input.
- Switch ignition off.
- Adjust Throttle Position sensor. See **THROTTLE POSITION SENSOR, ADJUSTING** .

If display does not change or is erratic:

Check Throttle Position sensor as follows:

- Press --> button.
- Press 0 and 6 buttons to select Function 06: "End transfer"
- Press Q button to enter input.
- Switch ignition off.
- Disconnect Throttle Position sensor 6-pin harness connector.
- Measure sensor resistance between connector terminals 1 + 3.

  Specification, Closed Throttle position: 0.8 to 1.4 k ohms

- Measure sensor resistance between connector terminals 2 + 3.

Adaptation

Enter channel number XX

G03258903

Fig. 15: Identifying Throttle Position Sensor 6-Pin Harness Connector Terminals
Courtesy of VOLKSWAGEN OF AMERICA, INC.

Specification, Closed Throttle position: 0.8 to 1.4 k ohms

- Check Closed Throttle Position (CTP) switch -F60- in Throttle Position sensor by measuring resistance between connector terminals 4 + 6.

  Specification, Closed Throttle position: 0.8 to 1.2 k ohms maximum

  Specification, Throttle depressed: "INFINITE" ohms

Vehicles with automatic transmission

- Measure sensor resistance between connector terminals 5 + 6.

  Specification, Closed Throttle position: "INFINITE" ohms

  Specification, Throttle depressed: 0.8 to 1.2 k ohms maximum

All vehicles

If specifications not obtained:

- Replace Throttle Position (TP) sensor -G79-. See **ACCELERATOR MECHANISM, SERVICING** (item - 2 -).

If specifications obtained:

- Connect VAG 1598/22 Test Box to Engine Control Module harness connector.

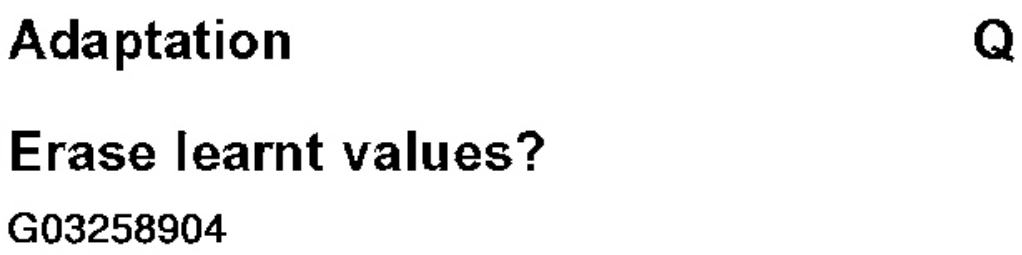

Fig. 16: Connecting VAG 1598/22 Test Box To Engine Control Module Harness Connector
Courtesy of VOLKSWAGEN OF AMERICA, INC.

- Check wiring for open circuit between Test Box and harness connector using Wiring diagram.

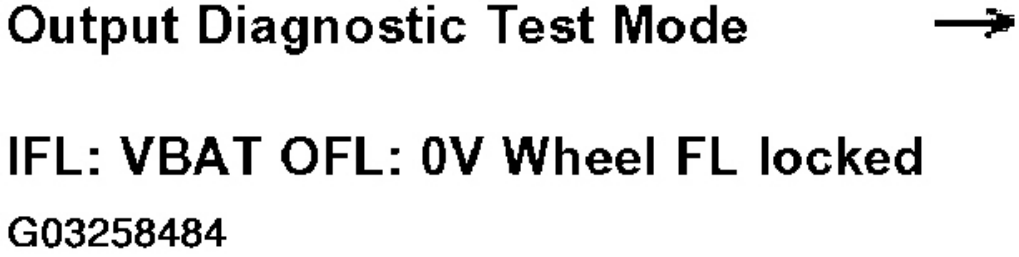

Fig. 17: Identifying Throttle Position Sensor Harness Connector Terminal
Courtesy of VOLKSWAGEN OF AMERICA, INC.

Up to MY 1999

- Terminal 1 + socket 24
- Terminal 2 + socket 11
- Terminal 3 + socket 23
- Terminal 4 + socket 12
- Terminal 6 + socket 25

Vehicles with automatic transmission only:

- Terminal 5 + socket 8

From MY 2000

- Terminal 1 + socket 63
- Terminal 2 + socket 12
- Terminal 3 + socket 50
- Terminal 4 + socket 69
- Terminal 6 + socket 70

Vehicles with automatic transmission only:

- Terminal 5 + socket 51

Wire resistance: 1.5 ohms maximum

- Check wires for short to one another, to vehicle Ground and to battery positive (+).

  Specification: "INFINITE" ohms

If wiring OK

- Replace Diesel Direct Fuel Injection (DFI) Engine Control Module (ECM) -J248-

  See Engine Control Module (ECM), Replacing .

THROTTLE POSITION SENSOR, ADJUSTING

(with sensor removed)

Adjusting cable cam

- Install cable disc in specific location

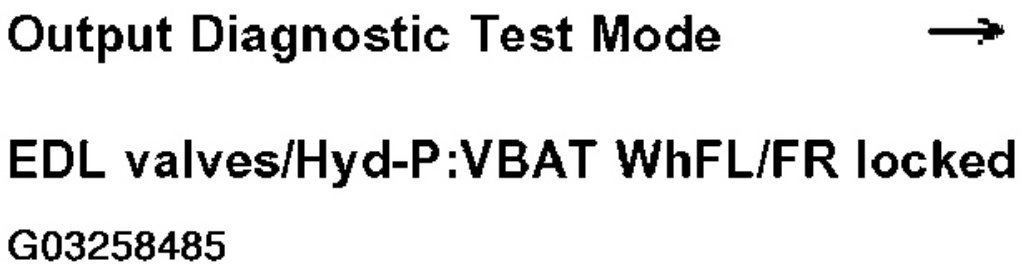

Fig. 18: Identifying Adjusting Cable Cam
Courtesy of VOLKSWAGEN OF AMERICA, INC.

- Attach Throttle Position (TP) sensor (with preassembled cable cam) to mounting block.
- Reconnect TP sensor 6-pin harness connector.

Fine adjustment with sensor installed

- Depress accelerator pedal by hand until accelerator pedal lies against accelerator pedal stop.

NOTE: For vehicles with automatic transmission: the pressure point or stop from the kick down switch must be felt before Wide Open Throttle is reached.

If accelerator pedal stop is not obtained or the pressure point of the kickdown switch can not be felt:

- Turn sensor in bracket slots.
- After adjusting TP sensor, check TP sensor function using VAG 1551/1552 Scan Tool. See **THROTTLE POSITION SENSOR, CHECKING** .